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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/651,031	08/29/2003	Kazuo Ohkouchi	2003_1222A	8535

513 7590 04/18/2005

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WASHINGTON, DC 20006-1021

EXAMINER

SASTRI, SATYA B

ART UNIT	PAPER NUMBER
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1713

DATE MAILED: 04/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/651,031

Applicant(s)

OHKOUCHI ET AL.

Examiner

Satya B. Sastri

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 August 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 1/23/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

1. This office action is in response to application filed on August 29, 2003. *Claims 1-6* are now pending in the application.

### *Claim Objection*

2. *Claim 1* is objected to because of the following informalities: the claim language is vague, as the method does not recite the various steps involved in a clear and concise manner. Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. *Claims 1-6* are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto et al. (US 5,785,821) in view of Mettetal et al. (US 4,358,347).

Sakamoto et al. disclose purification of acrylic acid from acrylic acid solution obtained after catalytic gas phase oxidation of propylene and/or acrolein. The aqueous acrylic acid is subjected to azeotropic distillation in the presence of poor water-soluble solvent (abstract). Examples of such solvents disclosed include aliphatic and aromatic hydrocarbons having 7-8 carbon atoms (column 4, lines 14-37). The aqueous acrylic acid solution generally contains 50-80% by weight of acrylic acid, 1-5% by weight of acetic acid and 20-40% by weight of water under the ordinary conditions of acrylic acid synthesis. The proportions of these components may vary depending upon the operating conditions of the oxidation reactor and/or acrylic acid collecting tower (column 3, lines 19-27). The temperature of the top of the acrylic acid-collecting tower is 50-70°C (column 3, lines 46-48). The solution drawn out of the bottom of the azeotropic distillation column contains predominantly acrylic acid with trace amounts of acetic acid and other substances (Example 2).

The difference between the prior art and the instant invention is that the prior art does not teach the removal of glyoxal present as impurity in the aqueous solution along with acrylic acid from the distillation tower.

Evidence that carbonyl compounds are known by-product impurities during production of unsaturated acids from olefins and molecular oxygen is provided by the secondary reference (column 2, lines 25-29). Since the primary reference teaches the process of removal of acrylic acid by azeotropic distillation, it would have been obvious to one of ordinary skill in the art at

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the time the invention was made to remove impurity such as glyoxal present in acrylic acid and thereby obtain the present invention.

6. *Claims 1-4, 6* are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto et al. (EP 0861820 A2) as evidence provided by Mettetal et al. (US 4,358,347).

The prior art to Sakamoto et al. discloses a method of recovering acrylic acid produced by gas phase catalytic oxidation of propylene and/or acrolein. The acrylic acid is collected in the form of an aqueous solution and introduced into an azeotropic separation column and distilling in the presence of an azeotropic solvent to isolate and recover the acrylic acid. The azeotropic solvent may be either a mixed solvent composed of solvent A (ethyl acrylate, methyl methacrylate, isopropenyl acetate etc) and solvent B (toluene, heptane, 1-heptene, cycloheptene etc.) or the solvent A alone (abstract). The disclosed temperature at the top of the column ranges from 45-55°C and temperature at the bottom of the column ranged from 100-110°C (column 7, lines 1-8).

The difference between the prior art and the instant invention is that the prior art does not teach the removal of glyoxal present as impurity in the aqueous solution along with acrylic acid from the distillation tower.

Evidence that carbonyl compounds are known by-product impurities during production of unsaturated acids from olefins and molecular oxygen is provided by the secondary reference (column 2, lines 25-29). Since the primary reference teaches the process of removal of acrylic acid by azeotropic distillation, it would have been obvious to one of ordinary skill in the art at

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the time the invention was made to remove impurity such as glyoxal present in acrylic acid and thereby obtain the present invention.

***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Satya Sastri at (571) 212 1112.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached at (571) 212 1114.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Satya Sastri*

SATYA SASTRI

April 1, 2005

**TATYANA ZALUKAEVA**  
**PRIMARY EXAMINER**

*T Zalu*